Bayesian models for methodologies of Appraisal

Lakatos model with memory

Define $x = Prob(C \& B_i / e)$

$\varepsilon = Prob(X / \sim(C \& B_i)) = Prob(X / \sim C \vee \sim B_i)$

where C = hard core

B_i = i^{th} auxiliary hypotheses in protective belt. $(i = 1 \cdots N)$

X = prediction for some observable result.

e = background knowledge.

$prob(X/4)$ means $prob(X \text{ is true given } 4 \text{ is true})$

$P_c(n_1, n_2 \cdots n_m) = Prob(C \mid n_m \text{ successful predictions follow the } (m-1)^{th} \text{ falsification})$

then $P_c(n_1, n_2 \cdots n_m) = P_c'(n_1 \cdots n_{m-1})$

$\times \ H(\sqrt{x}, P_c'(n_1 \cdots n_{m-1}), \Omega^{(n_m)})$

where $P_c'(n_1 \cdots n_{m-1}) = F(m-1) + P_c(n_1 \cdots n_{m-1})$

$\Omega^{(n_m)} = \Phi(\varepsilon, n_m, \sqrt{x} \cdot P_c'(n_1 \cdots n_{m-1}))$

$\Omega^{(n_1)} = \Phi(\varepsilon, n_1, x)$

$P_c(n_1) = \sqrt{x}\, \Omega^{(n_1)} \cdot x^{\frac{1}{2}}$, $F(m) = \dfrac{1}{1+(\exp(m-m_0))^2}$

$= \sqrt{x}\ H(\sqrt{x}, \sqrt{x}, \Omega^{(n_1)})$

$H(A, B, C) = \dfrac{1}{1 + \dfrac{\sqrt{A/B} - 1}{\frac{1}{AB} - 1}(C-1)}$

$= \dfrac{1}{(1-AB)}(1 - A + A(1-B)C)$

and $\Phi(A, B, C) = \left(1 - A^B + \dfrac{A^B}{C}\right)^{-1} / C = \dfrac{1}{C(1-A^B) + A^B}$

P.T.O.

alternative choice is

$$\textcircled{H}(A,B,C) = \frac{C(1-AB)}{1-A+A(1-B)C} \qquad \text{for } B > A$$

this choice keeps pol (bond core)
always greater than pol (anti. hydrogen)

Compare this with Shaffner

who finds for ad hoc. $P(H) \ll P(X)$

leading to $\mathcal{R}^{(1)} = \frac{P_1}{P_0} \ll 1$

which is unreasonable

Take $N = 7$, $m_0 = 4$, $\alpha = .01$, $\epsilon = .1$

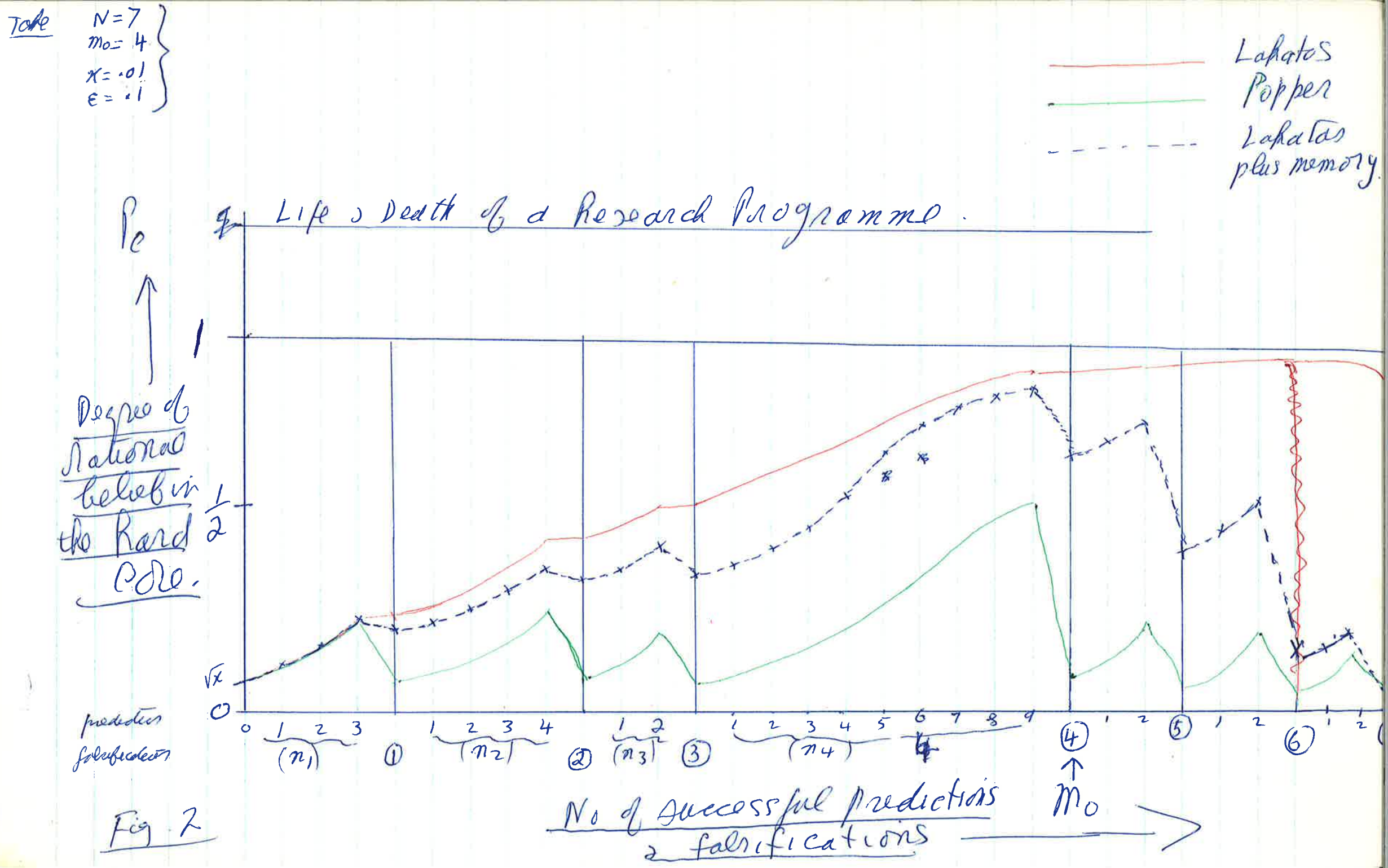
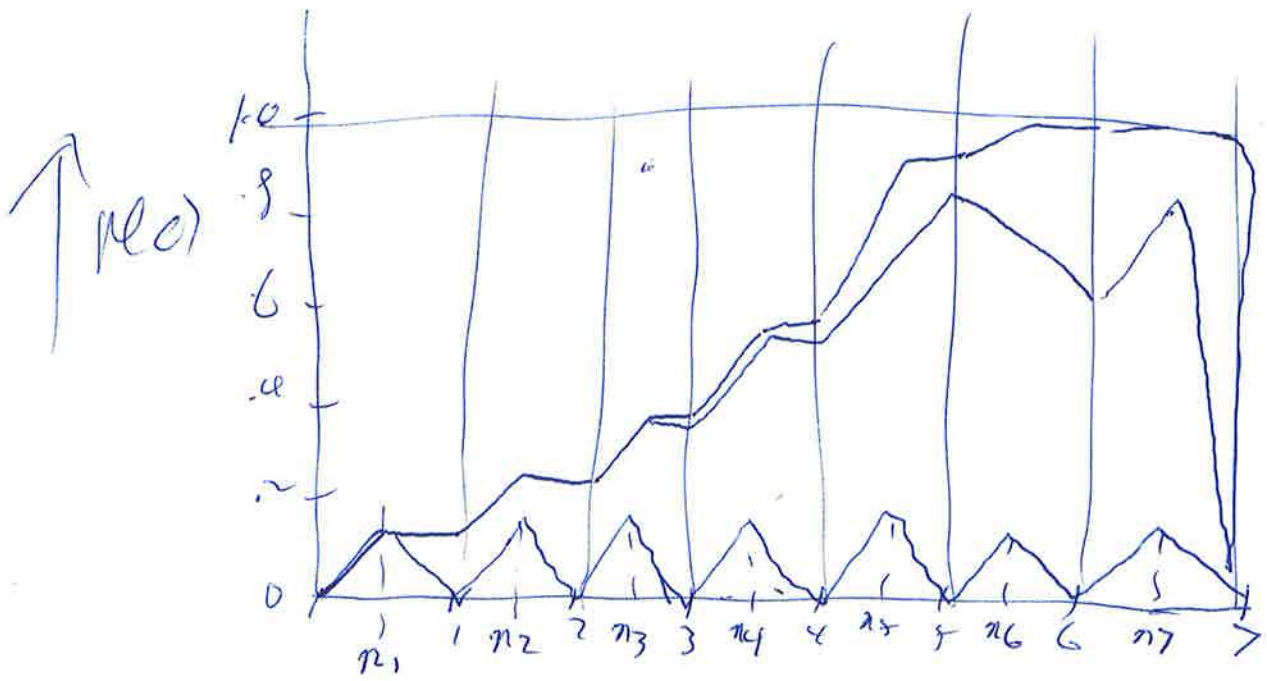


Fig 2

$$\eta_H = \frac{\eta(\quad A}{1 + A(\eta - 1)}$$